COMPARING DIFFERENT EXPOSURE MEASURES OF TRAFFIC-RELATED POLLUTION: A STUDY OF TERM LOW BIRTH WEIGHT IN LOS ANGELES COUNTY, CALIFORNIA

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Background and Aims: Few birth outcomes studies have examined associations with air toxics in traffic exhaust, such as benzene, toluene, ethyl benzene, and xylene (BTEX). Additionally, land use-based regression (LUR) provides estimates of small area variation in air pollution and contributes to an understanding of the spatial distribution of traffic-related air pollution. We compare effect estimates for term low birth weight (LBW) based on LUR-modeled estimates, and criteria pollutant and air toxics data.

Methods: We included births from 1/1/1995-12/31/2006 to women residing within 5 miles of a California Air Resources Board air toxics monitoring station in Los Angeles County, California. LUR-modeled estimates of NO, NO_2 and NO_x based on >200 field measurements were seasonalized using monitoring station data, and extracted for geocoded residential addresses. We examined associations with term LBW (≤37 weeks completed gestation and <2500g birth weight) using logistic regression adjusted for maternal age, race/ethnicity, education, parity, and infant gestational age and gestational age squared.

Results: We analyzed 8,181 term LBW cases and 370,922 term normal-weight non-cases. For LUR-estimated and air toxics exposures, the strongest associations were seen for the third trimester, the entire pregnancy, and the last pregnancy month averages. Adjusted odds ratios (ORs) for a 10ppb increase in NO, NO_2 and NO_x, respectively, were 1.02 (95%CI=1.01, 1.03), 1.05 (95%CI=1.02, 1.08), and 1.01 (95%CI=1.00, 1.02) for third trimester seasonalized LUR-estimated exposures, and 1.06 (95%CI=1.03, 1.09), 1.12 (95%CI=1.05, 1.19), and 1.04 (95%CI=1.02, 1.07) for unseasonalized LUR estimates. Third trimester BTEX exposures were associated with term LBW when stratifying by closest monitoring station, for women living within 5 miles of north Long Beach, Burbank, and downtown LA stations.

Conclusions: Using spatial contrasts (e.g. unseasonalized LUR estimates) and temporal contrasts (e.g. monitoring station estimates, stratified by station), we provide additional evidence that traffic-related air pollution increases the risk of term LBW.